



SVE BULLETIN

SPECIAL VEHICLE ENGINEERING – BODY BUILDERS ADVISORY SERVICE

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QVM Bulletin: Q-246R7

Date: 08 April, 2016

Revised 28 June, 2018

Updated 2017 - 2019MY E-Series Cutaway / Stripped Chassis Frontal Area and Weight Restrictions

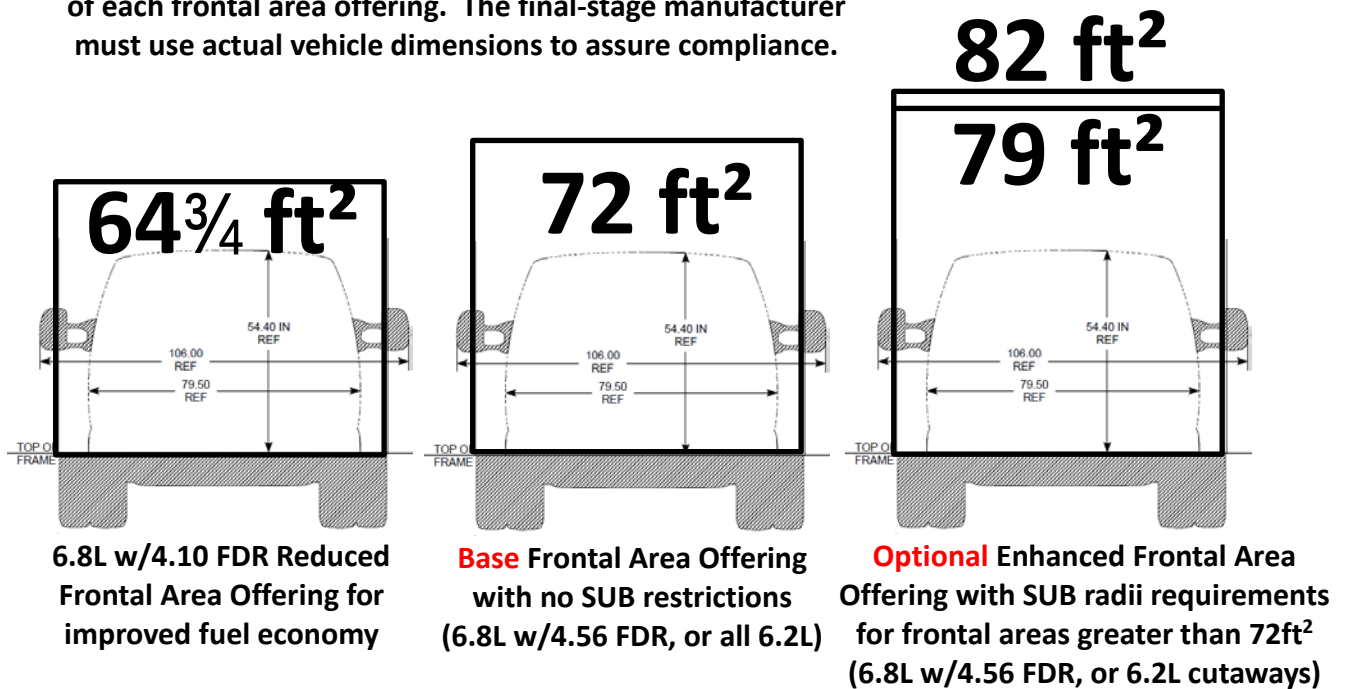
Revision	Update	Revision Date
Q-246R7	- Added clarification that vehicles ordered with Enhanced Frontal Area options 15D or 15F can be completed with bodies without radii requirements if base frontal area (72ft²) is not exceeded. - Included 2019 MY	28 June, 2018

Models Affected: 2017 - 2019MY E-350 SRW/DRW Cutaways and E-350 DRW Stripped Chassis Models with 6.2L or 6.8L Gasoline Engine, and E-450 Cutaway and Stripped Chassis models with 6.2L Gasoline Engine.

Description: Some heavy-duty incomplete vehicles are certified by Ford using chassis certification protocol. These vehicles, in completed form, must meet vehicle weight, frontal area, and (in some cases) design restrictions to maintain road loads covered by Ford's emission certification; otherwise, they must be recertified by the Final Stage Vehicle manufacturer. For 2017-19 MY, all E-350 SRW cutaway and DRW cutaway/stripped chassis models equipped with 6.2L or 6.8L gasoline engines and E-450 cutaways and stripped chassis models equipped with a 6.2L gasoline engine utilize a chassis certification protocol and have frontal area and maximum completed curb weights specified on the Vehicle Emissions Control Information (VECI) label. The VECI label is affixed to the forward underside of the engine hood on cutaways, and is affixed to the forward face of the structure that supports the steering column on stripped chassis models.

E-Series Chassis Certification Frontal Area Offerings*

Images are not to scale, and are shown to provide an overview of each frontal area offering. The final-stage manufacturer must use actual vehicle dimensions to assure compliance.



- Optional Enhanced Frontal Area requires a minimum 60 mm radii on frontal edge of second unit body when completed frontal area exceeds 72ft² (ref. pg. 6-7).

* E-450s with the 6.8L engine are dynamometer certified, and do not have frontal area restrictions

Frontal Area Certification Offerings Option Code Matrix

Model	Engine	Available	Rear Axle Ratio	Optional/ Standard	Max Frontal Area	2 nd Unit Body Edge Restrictions
E-350	6.2L	Cutaway and Stripped Chassis	4.10	Standard	72 ft ²	None
E-350	6.2L	Cutaway and Stripped Chassis	4.56	Included with Axle Codes X58, X85, XE8, or XF5	72 ft ²	None
E-350	6.2L	Cutaway	4.10	Optional (Order Code 15F)	79 ft ²	60 mm radii when above 72 ft ² , see pages 5 and 6
E-350	6.2L	Cutaway	4.56	Optional (Order Code 15F)	79 ft ²	60 mm radii when above 72 ft ² , see pages 5 and 6
E-350	6.8L	Cutaway and Stripped Chassis	4.56	Standard	72 ft ²	None
E-350	6.8L	Cutaway and Stripped Chassis	4.10	Included with Axle Codes X56, X52, XE6, or XE2	64¾ ft ²	None
E-350	6.8L	Cutaways	4.56	Optional (Order Code 15D)	82 ft ²	60 mm radii when above 72 ft ² , see pages 5 and 6
E-350	6.8L	Stripped Chassis	4.56	Optional (Order Code 15D)	82 ft ²	60 mm side radii and 1700 mm top radii when above 72 ft ² , see page 7
E-450	6.2L	Cutaway and Stripped Chassis	4.56	Standard	72 ft ²	None
E-450	6.2L	Cutaway	4.56	Optional (Order Code 15F)	79 ft ²	60 mm radii when above 72 ft ² , see pages 5 and 6
E-450	6.8L	Cutaway and Stripped Chassis	4.56	Standard	No Restriction	None

Frontal Area and Weight Restrictions for Completed Vehicle

Without Optional Sales Code 15D or 15F

- **E-350 SRW / DRW Cutaway and Stripped Chassis with 6.2L Gasoline Engine and 4.10 Rear Axle Ratio (standard):**
Rear Axle Order Codes X56, X52, XE6 or XE2
 - 6.69 m² [72 ft²] maximum frontal area
 - Maximum Completed Curb Weight (MCCW) not to exceed 5670 kg [12,500 lb] or GVWR, whichever is less.
(MCCW = chassis + second unit body + full fuel / fluids)
- **E-350 SRW / DRW Cutaway and Stripped Chassis with 6.2L Gasoline Engine and 4.56 Rear Axle Ratio (optional):**
Rear Axle Order Codes X58, X85, XE8 or XF5
 - 6.69 m² [72 ft²] maximum frontal area
 - Maximum Completed Curb Weight (MCCW) not to exceed 5670 kg [12,500 lb] or GVWR, whichever is less.
(MCCW = chassis + second unit body + full fuel / fluids)
- **E-450 Cutaway and Stripped Chassis with 6.2L Gasoline Engine and 4.56 Rear Axle Ratio (standard):**
Rear Axle Order Codes X83, or XF3
 - 6.69 m² [72 ft²] maximum frontal area
 - Maximum Completed Curb Weight (MCCW) not to exceed 5670 kg [12,500 lb].
(MCCW = chassis + second unit body + full fuel / fluids)

Frontal Area and Weight Restrictions for Completed Vehicle (cont'd)

Without Optional Sales Code 15D or 15F

- **E-350 SRW / DRW Cutaway and Stripped Chassis with 6.8L Gasoline Engine and 4.56 Rear Axle Ratio (standard):**

Rear Axle Order Codes X58, X85, XE8 or XF5

- 6.69 m² [72 ft²] maximum frontal area
- Maximum Completed Curb Weight (MCCW) not to exceed 5216 kg [11,500 lb] or GVWR, whichever is less.
(MCCW = chassis + second unit body + full fuel / fluids)

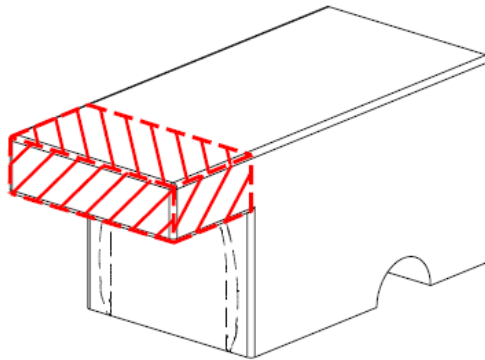
- **E-350 SRW / DRW Cutaway and Stripped Chassis with 6.8L Gasoline Engine and 4.10 Rear Axle Ratio:**

Rear Axle Order Codes X56, X52, XE6 or XE2

- 6.015 m² [64.75 ft²] maximum frontal area
- Maximum Completed Curb Weight (MCCW) not to exceed 5216 kg [11,500 lb] or GVWR, whichever is less.
(MCCW = chassis + second unit body + full fuel / fluids)
- “Box Extension Over Cab”-type second unit body not permitted

4.10 Axle Ratio 64¾ ft² Frontal Area Limitation (E-350 with 6.8L Engine) “Box Extension Over Cab”-Type Second Unit Body Exclusion:

Box Extension Over Cab-type second unit bodies (shown as red cross-hatched area in sketch below) are not permitted with the 4.10 axle ratio 64¾ ft² frontal area limitation as they cause significantly increased drag.



Enhanced Frontal Area Limitation, optional sales code 15D (covers finished vehicle frontal areas greater than 72ft² up to 82 ft²):

Vehicles with a maximum frontal area of 82 ft², as indicated on the VECI label, are being offered on E-350 models

-E-350 Cutaway Chassis Edge Radii Requirements for Body Frontal Areas greater than 72ft² and up to 82 ft²

Cutaway models with 6.8L gasoline engine and option code 15D. In addition to meeting the maximum frontal area of 82 ft², these vehicles must also meet additional design criteria in order to be covered by Ford's chassis certification, as follows:

Frontal Area: When exceeding the Base Frontal Area 72ft² up to a maximum of 82 ft²

Maximum Completed Curb Weight: 11,500 lb. (5216 Kg) or Maximum GVWR rating (whichever is less)

Final Stage Manufacturer Second Unit Body Design Requirements: Need to meet all Second Unit Body Edge Radii Requirements as specified in the attached illustration including:

- Top Edge 60 mm (2.4 in) minimum radius (Simple Box and Box Extension Over Cab).
- Edge Radius, equal to or greater than 60 mm (2.4 in) of remaining SUB edge surfaces as specified (Simple Box).
- Average Edge Radius, equal to or greater than 60 mm (2.4 in) of remaining SUB edge surfaces as specified in the formula shown on page 6. (Box Extension Over Cab).

Enhanced Frontal Area Limitation, optional sales code 15F (covers finished vehicle frontal areas greater than 72ft² up to 79 ft²):

Vehicles with a maximum frontal area of 79 ft², as indicated on the VECI label, are being offered on E-350 / E-450 models w/6.2L engines.

1) E-350 / E-450 w/6.2L Cutaway Chassis Edge Radii Requirements for Body Frontal Areas greater than 72ft² and up to 79 ft²

Cutaway models with 6.2L gasoline engine and option code 15F. In addition to meeting the maximum frontal area of 79 ft², these vehicles must also meet additional design criteria when exceeding the Base Frontal Area (72ft²) in order to be covered by Ford's chassis certification, as follows:

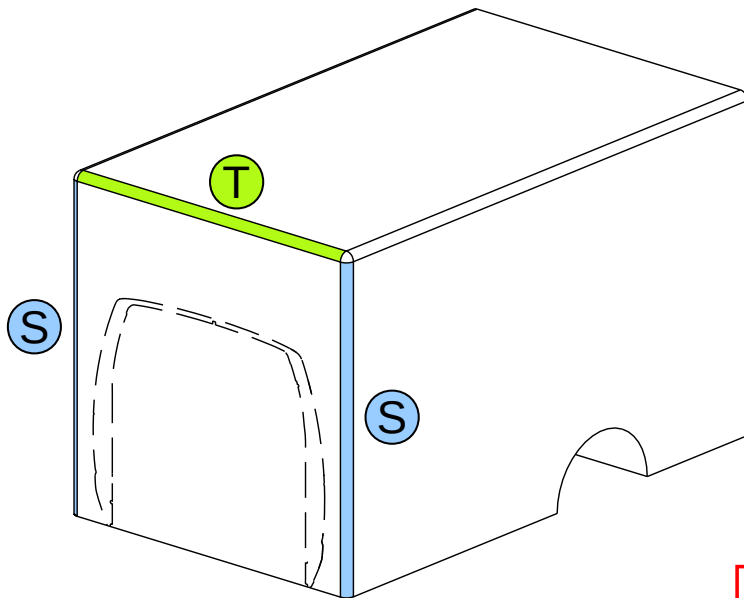
Frontal Area: When exceeding the Base Frontal Area 72ft² up to a maximum of 79 ft²

Maximum Completed Curb Weight: 12,500 lb. (5670 Kg) or Maximum GVWR rating (whichever is less)

Final Stage Manufacturer Second Unit Body Design Requirements: Need to meet all Second Unit Body Edge Radii Requirements as specified in the attached illustration including:

- Top Edge 60 mm (2.4 in) minimum radius (Simple Box and Box Extension Over Cab).
- Edge Radius, equal to or greater than 60 mm (2.4 in) of remaining SUB edge surfaces as specified (Simple Box).
- Average Edge Radius, equal to or greater than 60 mm (2.4 in) of remaining SUB edge surfaces as specified in the formula shown on page 6. (Box Extension Over Cab).

Cutaway Edge Radii Requirements For Enhanced SUB Frontal Areas



SIMPLE BOX

Top (T): Equal to or greater than 60 mm [2.4 in]

Sides (S): Equal to or greater than 60 mm [2.4 in]

T, E, S, B = length along box edge

NOTE: Top radius is most critical to good aerodynamics – the larger the better.

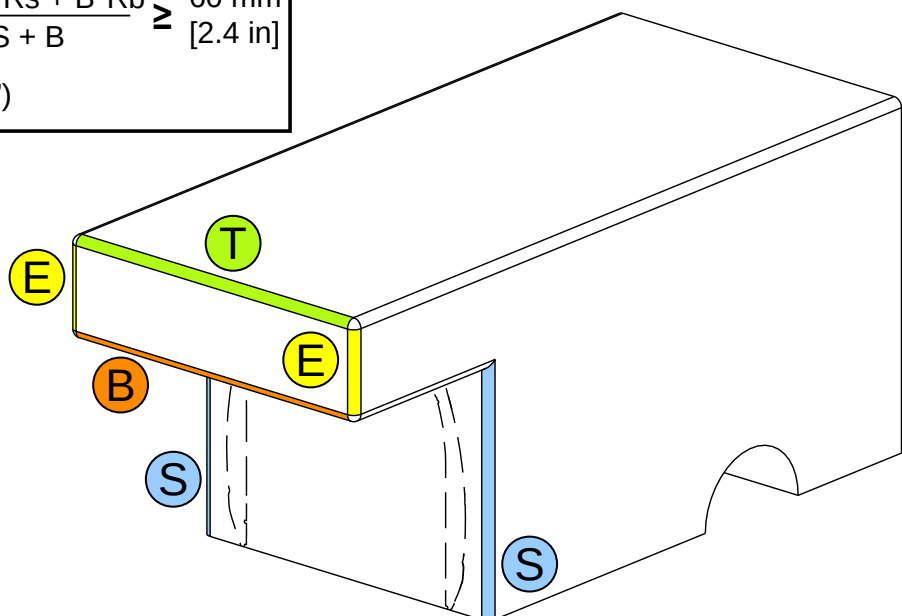
BOX EXTENSION OVER CAB

Top (T): Equal to or greater than 60 mm [2.4 in]

All Sides & Bottom of Extension (S,E,B):
Average Edge Radius to be equal to or greater than 60 mm [2.4 in]

$$\text{AVERAGE EDGE RADIUS} = \frac{2E \cdot R_e + 2S \cdot R_s + B \cdot R_b}{2E + 2S + B} \geq 60 \text{ mm [2.4 in]}$$

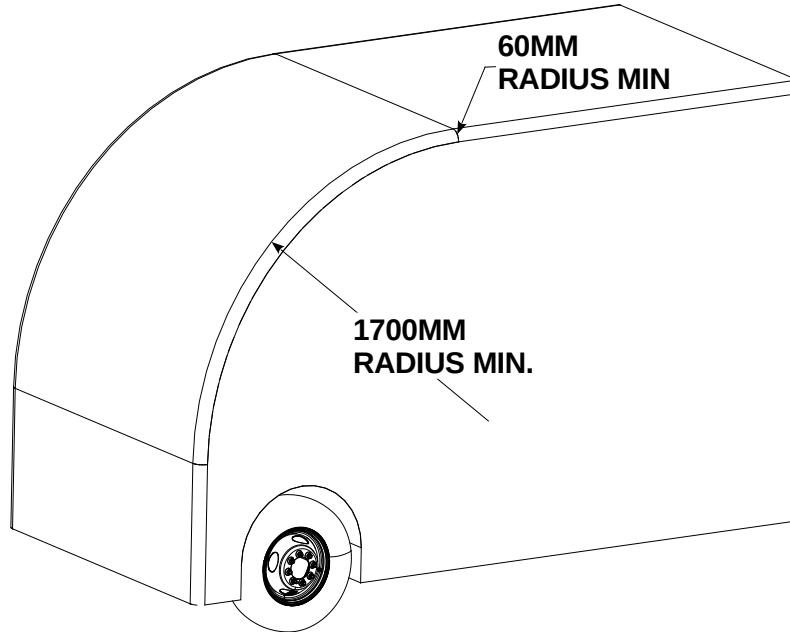
(Rn = radius of box edge “n”)



2) E-350 Stripped Chassis with 6.8L Engine Edge Radii Requirements for Body Frontal Areas greater than 72ft² up to 82 ft²

Final Stage Manufacturer Second Unit Body Design Requirements: Need to meet all Body Edge Radii Requirements as specified in the attached illustration including:

- Top Edge 1700 mm (66.92in) minimum radius as shown)
- Edge Radius, equal to or greater than 60 mm (2.4 in) of remaining body frontal edge surfaces as specified.
- Max allowable finished Curb Weight: 11500 lb. (5216 Kg) or max GVW rating, whichever is less.



Additional E-Series vehicle info:

Frontal Area and Weight Restrictions for Completed Vehicle (continued)

- E-450 Cut-away and Stripped Chassis Models with 6.8L Gasoline Engines:
 - No emissions-based restrictions for frontal area or maximum completed curb weight.

Calculating Frontal Area

Worksheets are provided as part of this bulletin to aid the final stage manufacturer in calculating frontal area.

Total completed vehicle frontal area is calculated by taking the total frontal area of the Second Unit Body (SUB) and adding the frontal area of the chassis below the top of frame and the mirrors (Shaded area on the worksheet).

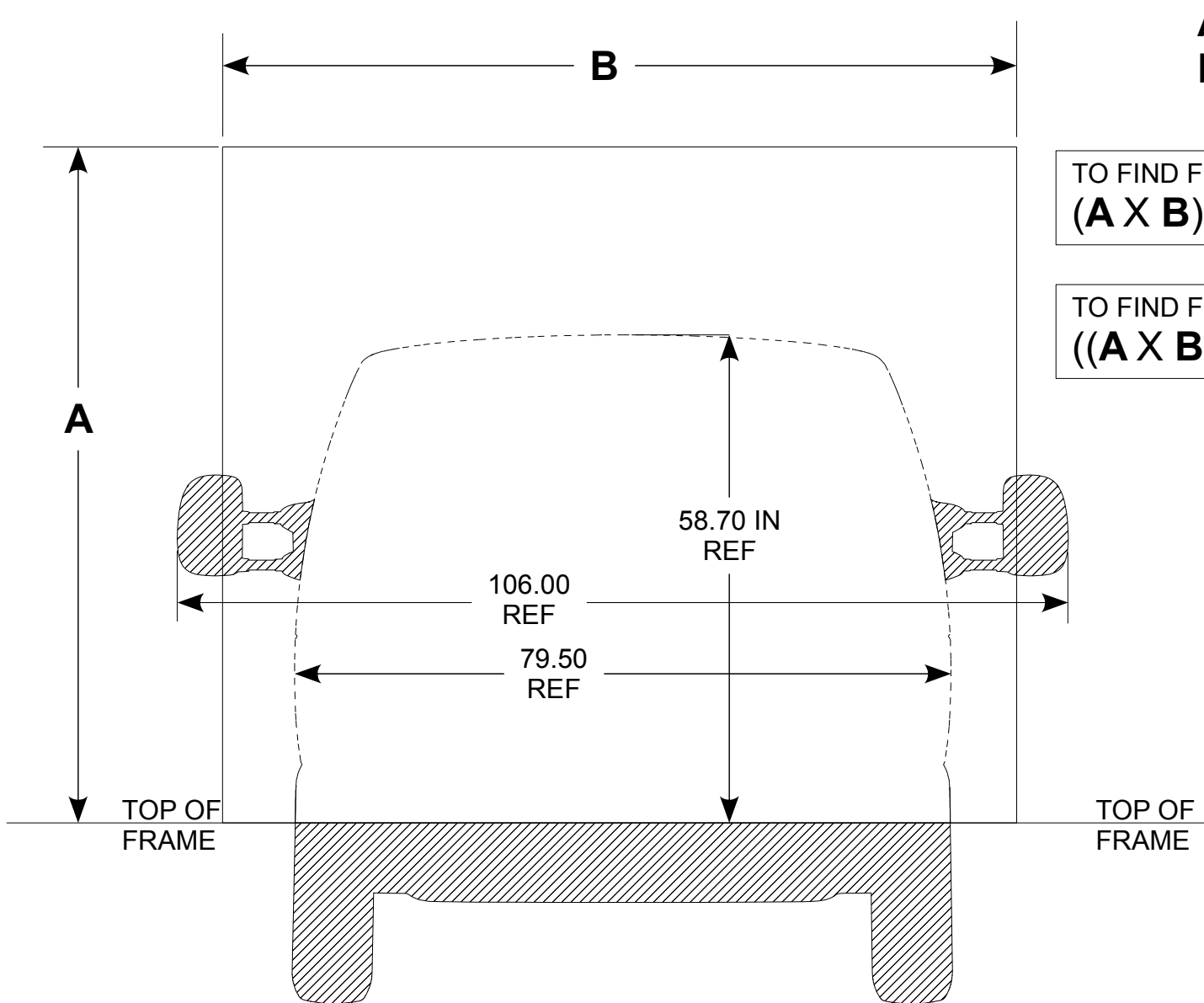
The final vehicle manufacturer will need to account for all aftermarket mirrors, equipment and second unit body areas.

If you have any questions, please contact the Ford Truck Body Builders Advisory Service as shown in the header of this bulletin.

Attachments:

E-Series CA Front Surface Area Worksheet SRW
E-Series CA Front Surface Area Worksheet DRW

Revision History		
Revision	Update	Revision Date
Q-246R2	Added Frontal Area Limitation for E-350 and E-450 with 6.2L engine.	05 December, 2016
Q-246R3	Added Frontal Area Limitation for E-350 and E-450 with 6.2L engine.	17 February 2017
Q-246R4	- Added Frontal Area Limitation for E-350 and E-450 with 6.2L engine. - Removed erroneous SSM reference	02 March, 2017
Q-246R5	- Added Frontal Area Limitation and guidance for E-350 and E-450 with 6.2L engine. - Included additional option code information	06 April, 2017
Q-246R6	Included 2018 Model Year in Affected models	10 August 2017
Q-246R7	- Added clarification that vehicles ordered with Enhanced Frontal Area options 15D or 15F can be completed with bodies without radii requirements if base frontal area (72ft²) is not exceeded. - Included 2019 MY	28 June, 2018



A = BOX HEIGHT IN INCHES

B = BOX WIDTH IN INCHES

TO FIND FRONT SURFACE AREA IN SQ INCHES
(A X B) + 1240.7 =

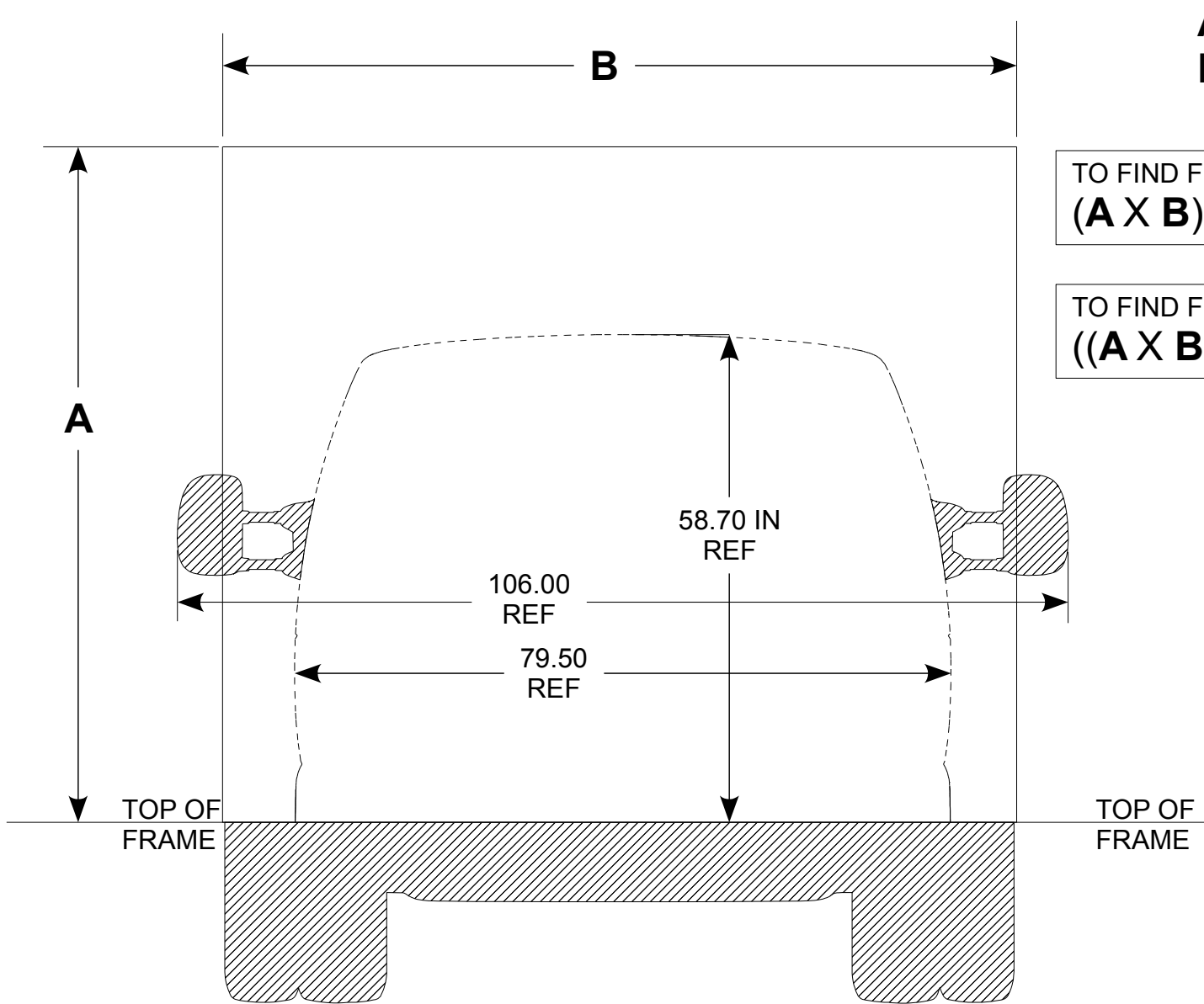
TO FIND FRONT SURFACE AREA IN SQ FEET
((A X B) / 144) + 8.62 =

BELOW FRAME SHADED AREA EQUALS
 $624293 / (25.4 \times 25.4) = 967.6560 \text{ SQ. IN.}$
 $967.6560 / (12 \times 12) = 6.7198 \text{ SQ. FT.}$

MIRROR SHADED AREA EQUALS
 $(88087.6 \times 2) / (25.4 \times 25.4) = 273.0721 \text{ SQ. IN.}$
 $273.0721 / (12 \times 12) = 1.8963 \text{ SQ. FT.}$

TOTAL SHADED AREA EQUALS
 $800468.2 / (25.4 \times 25.4) = 1240.7281 \text{ SQ. IN.}$
 $1429.6698 / (12 \times 12) = 8.6161 \text{ SQ. FT.}$

E SERIES CA FRONT SURFACE AREA WORKSHEET SRW



A = BOX HEIGHT IN INCHES

B = BOX WIDTH IN INCHES

TO FIND FRONT SURFACE AREA IN SQ INCHES
(A X B) + 1632.1 =

TO FIND FRONT SURFACE AREA IN SQ FEET
((A X B) / 144) + 11.33 =

BELOW FRAME SHADED AREA EQUALS
 $876808.0 / (25.4 \times 25.4) = 1359.0551 \text{ SQ. IN.}$
 $1359.0551 / (12 \times 12) = 9.4379 \text{ SQ. FT.}$

MIRROR SHADED AREA EQUALS
 $(88087.6 \times 2) / (25.4 \times 25.4) = 273.0721 \text{ SQ. IN.}$
 $273.0721 / (12 \times 12) = 1.8963 \text{ SQ. FT.}$

TOTAL SHADED AREA EQUALS
 $1052983.2 / (25.4 \times 25.4) = 1632.1272 \text{ SQ. IN.}$
 $1632.1272 / (12 \times 12) = 11.3342 \text{ SQ. FT.}$

E SERIES CA FRONT SURFACE AREA WORKSHEET DRW